IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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APPLICANT(s):	HOFMEISTER		
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Commissioner of Patents
Washington, DC 20231
ATTENTION: BOARD OF PATENT APPEALS AND INTERFERENCES

SUPPLEMENTAL BRIEF FOR APPELLANTS
(37 C.F.R. §1.192)

This is a supplemental appeal brief filed with a Request for Reinstatement of the Appeal in response to the Action mailed on April 5, 2002 re-opening prosecution in the above-identified application. A Notice of Appeal was mailed to the USPTO on September 5, 2001 in response to a final rejection of the claims pending in the application. An Appeal Brief (hereinafter the Appeal Brief) was previously filed by the Appellant on February 5, 2001, with the fees required under 37 C.F.R. §1.17. Accordingly, no further fees are due. This supplemental brief is being submitted in triplicate. The appendix of claims is attached hereto.

I. REAL PARTY IN INTEREST

The real party in interest in this Appeal is indicated in Section I of the Appeal Brief which is incorporated by reference herein in its entirety.

II. RELATED APPEALS AND INTERFERENCES

There are no directly related appeals or interferences regarding this application.

III. STATUS OF CLAIMS

Claims 1-29 are pending in this Application. Claims 1-5, 8-16, 26, and 28-29 have been finally rejected by the Examiner. Claims 6-7, and 19-23 have been allowed. Claims 17-18, 24-25, and 27 have been objected to. The rejection of Claims 1-5, 8-16, 26, and 28-29 is appealed.

IV. STATUS OF AMENDMENTS

The status of amendments is indicated in Section IV of the Appeal Brief which is incorporated by reference herein in its entirety.

V. SUMMARY OF INVENTION

The summary of the invention is stated in Section V of the Appeal Brief which is incorporated by reference herein in its entirety.

VI. ISSUES

1. Is Claim 5 unpatentable under 35 U.S.C. 102(b) as being anticipated by Fukasawa et al. (hereinafter Fukasawa).
2. Are Claims 1-4, 26, 28 and 29 unpatentable under 35 U.S.C. 103(a) as being obvious over Fukasawa.
3. Are Claims 1-4, 26, 28 and 29 unpatentable under 35 U.S.C. 103(a) as being obvious over Fukasawa in view of Bacchi et al. (hereinafter Bacchi).
4. Are Claims 1-4, 26, 28 and 29 unpatentable under 35 U.S.C. 103(a) as being obvious over Fukasawa in view of Sawada.
5. Are Claims 8-16 unpatentable under 35 U.S.C. 103(a) as being obvious over Bacchi in view of Ohta et al. (hereinafter Ohta).
6. Are Claims 8-16 unpatentable under 35 U.S.C. 103(a) as being obvious over Ohta in view of Bacchi.

VII. GROUPING OF CLAIMS

The claims do not stand or fall together. There are six groups of claims as follows:

Group 1 - Claim 5

Group 2 - Claims 1-4

Group 3 - Claim 26

Group 4 - Claim 29

Group 5 - Claims 8-16

Group 6 - Claim 28

In accordance with 37 C.F.R. §1.192(c)(7), an explanation of why the claims of the groups are believed to be separately patentable is contained in the Argument section below.

VIII. ARGUMENT

1. Claim 5

The argument with respect to the patentability of Claim 5 is provided in Section VIII(1) of the Appeal Brief which is incorporated by reference herein in its entirety.

2. Claims 1-4

The argument with respect to the patentability of Claim 1 is provided in Sections VIII(2)(a)-(c) of the Appeal Brief which are incorporated by reference herein in their entirety.

3. Claim 26

The argument with respect to the patentability of Claim 26 is provided in Sections VIII(3)(a)-(c) of the Appeal Brief which are incorporated by reference herein in their entirety.

4. Claim 29

The argument with respect to the patentability of Claim 29 is provided in Sections VIII(4)(a)-(c) of the Appeal Brief which are incorporated by reference herein in their entirety.

5. Claims 8-16

The argument with respect to the patentability of Claim 8 is provided in Sections VIII(5)(a), and (6) of the Appeal Brief which are incorporated by reference herein in their entirety.

7. Claim 28

a. Claim 28 is not obvious over Fukasawa

Claim 28 calls for the end effector being slaved to the forearm so that when the forearm rotates about the elbow, the end effector rotates about the wrist.

Fukasawa does not disclose or suggest the features recited in claim 28. Fukasawa discloses that multi-joint arm 5 has three independently pivoted convey arms 51, 52, 53 (col. 6, lines 40-43). The upper convey arm 53 in Fukasawa (which has wafer holding portion 53c) is independently rotated from intermediate convey arms 51, 52 by its own motor. Hence, the upper convey arm 53 used to hold the wafer in Fukasawa is not slaved in any way to any intermediate convey arm. Nowhere does Fukasawa disclose or suggest the end effector being slaved to the forearm so that when the forearm rotates about the elbow, the end effector rotates about the wrist as called for in Claim 28.

Claim 28 is not obvious over Fukasawa. The Examiner's rejection of claim 28 based on Fukasawa should be reversed.

b. Claim 28 is not obvious over Fukasawa in view of Bacchi

Claim 28 calls for the end effector being slaved to the forearm so that when the forearm rotates about the elbow, the end effector rotates about the wrist, wherein the robot transport arm is adapted to transport substrates along generally parallel axes of translation straddling the drive section. Neither Fukasawa nor Bacchi disclose or suggest these features, nor is there any suggestion, or motivation from Fukasawa and Bacchi alone for one skilled in the art to combine these references.

As noted before, Fukasawa discloses three independently pivoted convey arms 51, 52, 53 that can convey a wafer along a convey path that may be freely selected from the range of freedom of movement provided by the combination of three independently pivoted convey arms. Bacchi, on the other hand discloses an arm mechanism 10 with two independent degrees of freedom. Also, the cassettes 168l, 168r to which the arm 10 in Bacchi moves the wafers are positioned differently (i.e., one cassette 168l is directly in front of the arm) than the position of the chambers (e.g. 3a, 3b) in Fukasawa. The arm 10 in Bacchi with only two independent degrees of freedom is not equivalent to the arm in Fukasawa having three independent degrees of freedom. The arm 10 in Bacchi having only two independent degrees of freedom does not provide the same range of freedom of movement as the three independent degree of freedom arm in Fukasawa. Thus, the arm 10 in Bacchi is not equivalent to, and cannot be substituted for the arm in Fukasawa. Moreover, as the positions of the cassettes 168l, 168r in Bacchi are different than the positions of the chambers 3a, 3b in Fukasawa (i.e. the convey paths of the arm 10 in Bacchi are thus different than the convey paths in Fukasawa), there appears to be nothing in Fukasawa and Bacchi themselves

which would motivate or suggest to one skilled in the art to replace the arm in Fukasawa with the arm in Bacchi.

In addition, as noted before, Fukasawa fails to disclose or suggest transporting substrates along generally parallel axes of translation straddling the drive section. The freely selected paths along which the Fukasawa arm, with its three independently pivoted convey arms, can convey a wafer does not make it obvious to one skilled in the art to transport substrates along generally parallel axes of translation straddling the drive section. Also, the transport paths to cassettes 168l, 168r in Bacchi do not straddle the shoulder of the arm. As seen in Fig. 6A, the path to cassette 168l extends directly through the shoulder (i.e. the origin in the X-Y axis plot) of the arm. Nowhere does Bacchi disclose or suggest transporting substrates along generally parallel axes of translation straddling the drive section as called for in claim 28. Neither Fukasawa, nor Bacchi disclose or suggest the features called for in claim 28. Thus, the combination of Fukasawa and Bacchi cannot provide features which are not disclosed or suggested in either reference.

Claim 28 is not obvious over Fukasawa in view of Bacchi. The Examiner's rejection of claim 28 based on Fukasawa in view of Bacchi should be reversed.

c. Claim 28 is not obvious over Fukasawa in view of Sawada

Fukasawa fails to disclose the end effector being slaved to the forearm so that when the forearm rotates about the elbow, the end effector rotates about the wrist. Fukasawa fails to

disclose that the robot transport arm transports substrates (into and out of holding areas) along generally parallel axes of translation straddling the drive section. Sawada discloses an arm assembly with two independent degrees of freedom similar to Bacchi. In addition, Sawada discloses only that the third arm 54 is moved along a single straight line h which extends through the shoulder O of the arm (see Figs. 7A-7C, 9A-9C). Nowhere does Sawada disclose that the arm can move wafers to a location other than one which is in line with the drive section of the arm. In contrast, the arm assembly in Fukasawa has three independent degrees of freedom and moves wafers to chambers 3a, 3b which are offset on both sides of the drive section of the arm assembly. A person skilled in the art would not recognize that the arm in Sawada is equivalent to the arm of Fukasawa and would not substitute the Sawada arm for that in Fukasawa as stated by the Examiner.

Sawada fails to disclose or suggest that the substrate is moved along one of a number of parallel axes, much less parallel axes straddling the drive section of the transport arm as otherwise called for in claim 28. Even if Fukasawa and Sawada were combined (though the appellant maintains that it would not have been obvious for one skilled in the art to do so), the combination of Fukasawa and Sawada does not provide the features called for in claim 28. Modifying the three independent degree of freedom arm in Fukasawa in view of the two independent degree of freedom arm in Sawada which (according to Sawada) can move substrates only along a centerline axis through the shoulder of the arm, will not provide a transport arm with the end effector slaved to the forearm so that when the forearm rotates about the elbow, the end effector rotates about the wrist, wherein the robot

transport arm transports substrates along generally parallel axes of translation straddling the drive section of the transport arm as called for in claim 28.

Claim 28 is not obvious over Fukasawa in view of Sawada. The Examiner's rejection of claim 28 based on Fukasawa in view of Sawada should be reversed.

CONCLUSION

In conclusion, in view of the arguments presented above and in the portions of the Appeal Brief noted above and incorporated by reference herein their entirety, it is respectfully requested that the Examiner's rejections of Claims 1-5, 8-16, 26, and 28-29 be reversed.

The Commissioner is hereby authorized to charge payment for any additional fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,

Janik Marcovici (Reg. No. 42,841) — 9/5/02 Date

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CERTIFICATE OF MAILING

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Date: 8/5/02 Signature: Deanna Murphy
Person Making Deposit

APPENDIX

REJECTED CLAIMS

1. A method for transporting a substrate into and out of a substrate holding area on a substrate processing apparatus comprising the steps of:

providing the substrate processing apparatus with a transport arm connected to a drive section with two drive shafts;

providing the substrate on an end effector of the transport arm, the end effector being rotatably mounted to a wrist of the transport arm; and

rotating the two drive shafts to effect rotation of the transport arm about an axis of rotation at a shoulder of the transport arm for rotating the wrist about the axis of rotation, and

to effect extension of the transport arm for radially displacing the wrist of the transport arm relative to the axis of rotation at the shoulder of the transport arm, wherein the extension of the transport arm to radially displace the wrist causes rotation of the end effector about the wrist to rotate the substrate about the axis of rotation at the shoulder of the transport arm in concert with rotation of the wrist about the axis of rotation at the shoulder of the transport arm so that the substrate is moved along one of a number of generally parallel axes of translation straddling the drive section.

2. A method as in Claim 1, wherein the steps of moving and rotating are harmonized with each other so that the substrate on

the end effector is substantially rectilinearly translated with respect to the substrate holding area along an axis of translation extending through a substrate transport passage of the substrate holding area.

3. A method as in Claim 1, wherein the substrate processing apparatus comprises at least two of the substrate holding areas located side by side to each other, the transport arm transporting substrates into and out of each of the two substrate holding areas, and wherein the axis of rotation at the shoulder of the transport arm stays in one location relative to the two substrate holding areas when the transport arm transports substrates into and out of each of the two substrate holding areas.

4. A method as in Claim 1, wherein the transport arm is an articulated arm comprising an upper arm link and a lower arm link and wherein the step of moving comprises independently rotating the lower arm link relative to the upper arm link.

5. A method for transporting a substrate into and out of a substrate holding area comprising the steps of:

providing the substrate on an end effector of a transport arm;

rotating the transport arm as a unit about an axis of rotation; and

moving the end effector of the transport arm to radially displace the end effector relative to the axis of rotation, the end effector being moved from an initial position to a final position, the initial and

final positions of the end effector being connected by an axis of translation of the end effector;

wherein the radial displacement of the end effector complements the rotation of the transport arm about the axis of rotation to result in the substrate being substantially rectilinearly translated along the axis of translation to and from the substrate holding area, the axis of translation being one of two generally parallel axes of translation on opposite sides of the drive section.

8. A substrate transport apparatus comprising:

a drive section; and

a robot transport arm mounted to the drive section, the robot transport arm having a wrist and an end effector to hold a substrate thereon, the end effector being rotatably mounted to the wrist to rotate about the wrist, rotation of the end effector about the wrist being slaved to the robot transport arm;

wherein the robot transport arm is adapted to transport substrates into and out of three general side by side orientated substrate holding areas with the drive section being located in only one location relative to the three holding areas, and wherein the three side by side substrate holding areas are generally aligned with each other and disposed along one side of the drive section.

9. A substrate transport apparatus as in Claim 8, wherein the end effector is slaved to the robot transport arm so that, when the end effector rotates about the wrist relative to the robot transport arm, the substrate on the end effector and the wrist rotate about the drive section at a substantially equal rate.

10. A substrate transport apparatus as in Claim 8, wherein the robot transport arm is mounted to a drive shaft of the drive section, and wherein the end effector is slaved to the robot transport arm so that when the robot transport arm radially translates the end effector relative to the drive shaft the end effector is automatically rotated about the wrist.

11. A substrate transport apparatus as in Claim 10, wherein the end effector rotates about the wrist to rotate the substrate about the wrist so that as the substrate rotates about the wrist, the substrate, the wrist and the drive shaft remain generally aligned.

12. A substrate transport apparatus as in Claim 8, wherein the robot transport arm is an articulated arm comprising an upper arm link and a lower arm link, the upper arm link extending from a shoulder of the robot transport to an elbow of the robot transport arm and the lower arm link extending from the elbow to the wrist of the robot transport arm, and wherein the robot transport arm is mounted at the shoulder to a drive shaft of the drive section.

13. A substrate transport apparatus as in Claim 12, wherein the upper arm link is mounted to the drive shaft to rotate in unison with the drive shaft, and wherein the lower arm link is

rotatably mounted to the upper arm link to rotate relative to the upper arm link.

14. A substrate transport apparatus as in Claim 12, wherein the robot transport arm includes means for automatically rotating the end effector about the wrist, and wherein the means for automatically rotating the end effector drivingly connect the lower arm link to the end effector slaving rotation of the end effector about the wrist to the rotation of the lower arm link about the elbow.

15. A substrate transport apparatus as in Claim 12, wherein the upper arm link and the lower arm link are rotated independently of each other to effect robot transport arm transport of substrates into and out of the three substrate holding areas.

16. A substrate transport apparatus as in Claim 8, wherein the robot transport arm transports substrates substantially rectilinearly into and out of each of the three substrate holding areas along axes of translation corresponding to each holding area.

26. A method as in Claim 1, wherein the substrate processing apparatus comprises at least three of the substrate holding areas located side by side to each other, the transport arm transporting substrates into and out of each of the three substrate holding areas, and wherein the axis of rotation at the shoulder of the transport arm stays in one location relative to the three substrate holding areas when the transport arm transports substrates into and out of each of the three substrate holding areas.

28. A substrate transport apparatus comprising:

a drive section with a first drive shaft, and a second drive shaft;

a robot transport arm mounted to the drive section, the robot transport arm including an upper arm, a forearm pivotably connected to the upper arm to pivot about an elbow of the upper arm, and an end effector pivotably connected to the forearm to pivot about a wrist of the forearm, the upper arm being connected to the first drive shaft so that the upper arm is rotated about the drive section when the first drive shaft is rotated, the elbow being connected to the second drive shaft so that the forearm is rotated about the elbow when the second drive shaft is rotated, the end effector being slaved to the forearm so that when the forearm rotates about the elbow the end effector rotates about the wrist;

wherein the robot transport arm is adapted to transport substrates with the end effector along generally parallel axes of translation straddling the drive section to and from two side by side substrate holding areas disposed along a side of a substrate processing apparatus with the drive section being located in only one location relative to the substrate processing apparatus.

29. A method for transporting a substrate into and out of a substrate holding area on a substrate processing apparatus comprising the steps of:

providing the substrate processing apparatus with a transport arm connected to a drive section having two drive shafts;

providing the substrate on an end effector of the transport arm, the end effector being rotatably mounted to a wrist of the transport arm; and

rotating the two drive shafts to effect rotation of the transport arm about an axis of rotation at a shoulder of the transport arm for rotating the wrist about the axis of rotation, and to effect extension of the transport arm to radially displace the wrist of the transport arm relative to the axis of rotation at the shoulder of the transport arm, wherein the extension of the transport arm when the second drive shaft is rotated effects rotation of the end effector about the wrist, the rotation of the transport arm about the axis of rotation at the shoulder, the extension of the transport arm to radially displace the wrist relative to the axis of rotation at the shoulder and the rotation of the end effector about the wrist being in concert so that the substrate is moved into and out of the substrate holding area along an axis of translation from a number of generally parallel axes of translation straddling the axis of rotation at the shoulder.